What is claimed is:

1.   A coherent receiver operable for use in an underwater
telemetry system, comprising:

        at least one data input channel connected to said coherent
            receiver;

        a decision feedback equalizer for receiving said at least
            one data input channel and producing a single stream
            of pre-processed data at a decision feedback equalizer
            output; and

        a turbo-equalizer connected to said feedback equalizer
            output for receiving said single stream of pre-
            processed data.

2.   The coherent receiver of claim 1 further comprising:

        a training symbol sequence generator; and

        a correlator in communication with said training symbol
            sequence generator and said decision feedback
            equalizer, an output of said correlator being
            receivable by said turbo-equalizer.

3. The coherent receiver of claim 1 wherein said turbo equalizer-further comprises an equalizer portion and a decoder portion interconnected for iterative operation.

4. The coherent receiver of claim 3 wherein said equalizer portion and said decoder portion each utilize a MAP algorithm.

5. The coherent receiver of claim 1 further comprising a plurality of receiver transducers for producing spatially diverse data for said at least one input channel.

6. The coherent receiver of claim 1 further comprising a single receiver transducer for producing time diverse data for said at least one input channel.

7. The coherent receiver of claim 6 wherein said single receiver transducer includes a plurality of input channels and said decision feedback equalizer is operable for selectively controlling a total number of said input channels utilized by said decision feedback equalizer based on error analysis of said time diverse data.

8. A method for operation of a coherent telemetry system, said method comprising:

detecting a received signal comprising a plurality of data
channels;

pre-processing said plurality of data channels within a
decision feedback equalizer to produce a single output
data stream from said plurality of data channels; and

post-processing said single output data stream within a
single channel turbo-equalizer.

9.   The method of claim 8 wherein said post-processing of said
single output data stream further comprises iteratively
equalizing and decoding data from said single output data stream
to produce a corrected data output stream.

10.   The method of claim 9 further comprising utilizing a MAP
algorithm for said steps of iteratively equalizing and decoding.

11.   The method of claim 8 further comprising mitigating phase
jitter in said single output data stream utilizing said decision
feedback equalizer.

12.   The method of claim 8 further comprising:

providing that said received signal further comprises a
transmitted training symbol sequence;

pre-processing said transmitted training symbol sequence to
provide a pre-processed training sequence;

producing a local training symbol sequence within said
receiver;

correlating said local training symbol sequence with said
pre-processed training sequence to provide a channel
estimate; and

utilizing said channel estimate within said turbo-
equalizer.

13. The method of claim 8 further comprising providing that said
received data further comprises time diversity data.

14. The method of claim 8 further comprising providing that said
received data further comprises spatial diversity data.